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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/477,570
Filing Date: January 06, 2000
Appellant(s): KNABENBAURER, DANIEL J.

Knabenbauer
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 06/21/2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejection of claims 2, 4-24, 26 and 28-49 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

3,585,443	Krembs	01-1971

3,790,849	Mayer et al	02-1974
5,801,666	MacFarlane	09-1998

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> **(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.**

1. Claims 2 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krembs "previously cited" (US 3,585,443) in view of MacFarlane "IDS" (US 5,801,666).

2. As to claims 2 and 26, Krembs teaches as shown in Figs. 1 and 3 the three-dimensional gas discharge display array is formed by a plurality of parallel two-dimensional gas discharge matrices 5 (col. 2, lines 18-20). The electrode pairs formed by glass enclosed wires 1 and 3 are fired through the X-Y-Z display control and power supply 17 (col. 2, lines 42-44). The firing potential of different polarities is impressed on each of the two electrodes associated with a given intersecting point in the gas display array contained in box 7. At the point where these two electrodes intersect the applied voltages add such that the potential difference between the two electrodes is greater than the firing potential. This causes a discharge at this point (col. 2, lines 47-54). That

means, different polarities of each the two electrodes at that point perform an anode and a cathode.

Accordingly, Krembs teaches all the claimed limitations except that pixels having a red light emitting element, a green light emitting element, and a blue light emitting element, and a phosphorus material.

However, MacFarlane teaches a three-dimensional display device comprising a plurality of pixels each including red, green, and blue voxels (fig. 2 and fig. 6, col. 6, lines 7-8 and col. 6, lines 23-24). Red, green, blue dyes that fluoresce (abstract) perform a phosphorus material.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify each Krembs' pixel including red, green, and blue voxels, in view of the teaching in the MacFarlane's reference because this would provide a full color display device with a wide range of visible spectrum as taught by MacFarlane (col. 2, lines 52-64).

3. Claims 2, 4-24, 26 and 28-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mayer et al "newly cited" (US 3,790849) in view of MacFarlane.

4. As to claims 2 and 26, Mayer et al teaches a three-dimensional display (col. 3, lines 26-27) comprising:

computer 12 operates as an interface through which information to be displayed may be input from an external source to the three dimensional monitor system (col. 6, lines 40-43);

aluminum wire, for example, provides a suitable conductor for this purpose which may be suitably anodized (col. 2, lines 43-46). That means, at least two cross aluminum wires at grid 52 or grid 54 or grid 56 have an anode; therefore, if the grid is the anode, then the other grid has to be a cathode; a gas volume 17, and a phosphorus material (see figure 9, column 6, lines 27-52).

Accordingly, Mayer et al teaches all the claimed limitations except that pixels having a red light emitting element, a green light emitting element, and a blue light emitting element.

However, MacFarlane teaches a three-dimensional display device comprising a plurality of pixels each including red, green, and blue voxels (fig. 2 and fig. 6, col. 6, lines 7-8 and col. 6, lines 23-24).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify each Mayer et al's pixel including red, green, and blue voxels, in view of the teaching in the MacFarlane's reference because this would provide a full color display device with a wide range of visible spectrum as taught by MacFarlane (col. 2, lines 52-64).

5. As to claims 4 and 29, Mayer teaches three dimensional panel (col. 3, lines 26-27) comprising aluminum wire, for example, provides a suitable conductor for this purpose which may be suitably anodized (col. 2, lines 43-46). That means, at least two cross aluminum wires at grid 52 or grid 54 or grid 56 have an anode; therefore, if the grid is the anode, then the other grid has to be a cathode. MacFarlane teaches a three-

dimensional display device comprising a plurality of pixels each including red, green, and blue voxels (fig. 2 and fig. 6, col. 6, lines 7-8 and col. 6, lines 23-24).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify each Mayer et al's pixel including red, green, and blue voxels, in view of the teaching in the MacFarlane reference because this would provide a full color display device with a wide range of visible spectrum as taught by MacFarlane (col. 2, lines 52-64).

6. As to claims 5, 6, 7, 28, 30, 31, 32, Mayer teaches three dimensional panel (col. 3, lines 26-27) comprising aluminum wire, for example, provides a suitable conductor for this purpose which may be suitably anodized (col. 2, lines 43-46). That means, at least two cross aluminum wires at grid 52 or grid 54 or grid 56 have an anode; therefore, if the grid is the anode, then the other grid has to be a cathode. This is seen to meet the claimed limitations as follow:

the anode of a one of the pixels is shared by at least one other pixel, recited *in claim 5*; the cathode of a one of the pixels is shared by at least one other pixel, recited *in claim 28*; the anode of a one of the pixels is shared by one or more other pixel, recited *in claim 30;* a face of one of the pixels is shared by another pixels, recited in *claims 6 and 31*; the side of the pixel is the side of the another neighboring pixel, recited in *claims 7 and 32.*

7. As to claims 8 and 33, Mayer teaches three dimensional panel (col. 3, lines 26-27) comprising aluminum wire, for example, provides a suitable conductor for this purpose which may be suitably anodized (col. 2, lines 43-46). This is seen to meet the

claimed limitations signal source and power source are positioned in seams between pixels.

8. As to claims 9, 34 and 35, Mayer et al teaches the intersection of anodized glass wires at grids 52, 54, 56 making cubic pixels that would perform as an anode and a cathode (column 6, lines 1-29 and column 7, lines 3-11). This is seen to meet the claimed limitations an anode bus line is positioned in a seam from a first anode of a pixel to a second anode of another pixel; and a cathode bus line is positioned in a seam from a cathode of a pixel to a cathode of another pixel.

9. As to claims 10-12 and 36-38, MacFarlane teaches a three-dimensional display device comprising a plurality of pixels each including red, green, and blue voxels (fig. 2 and fig. 6, col. 6, lines 7-8 and col. 6, lines 23-24). Mayer teaches three dimensional matrix (col. 3, lines 26-27) comprising aluminum wire, for example, provides a suitable conductor for this purpose which may be suitably anodized (col. 2, lines 43-46). That means, anodized aluminum wires are anode bus line. The anode bus lines makes up the three dimensional matrix, comprising pixels in a seam from a first grid of a red, green, blue pixels to a second grid of another red, green, blue pixels.

This is seen to meet the claimed limitations a first anode of a first red, green, blue light emitting element of a pixel is connected to a second anode of a second red, green, blue light emitting element in another pixel by a straight line bus connection along a seam in any direction in the three dimensional matrix.

10. As to claims 13 and 39, Mayer teaches three dimensional panel (col. 3, lines 26-27) comprising aluminum wire, for example, provides a suitable conductor for this

purpose which may be suitably anodized (col. 2, lines 43-46). That means, at least two cross aluminum wires at grid 52 or grid 54 or grid 56 have an anode; therefore, if the grid is the anode, then the other grid has to be a cathode. This is seen to meet the claimed limitations a first cathode of a first pixels is connected to a second cathode of a second pixel by a straight line connection along a seam in any direction in the three dimensional matrix.

11. As to claims 14 and 40, Mayer et al teaches the intersection of anodized glass wires at grids 52, 54, 56 making cubic pixels, and based on the **Pythagorean theorem** "the theorem that the sum of the squares of the lengths of the sides of a right triangle is equal to the square of the length of the hypotenuse" that would perform equally well with the distance between two adjacent anodes is a square root of two multiplied by a length of one side of a pixel.

12. As to claims 15-18 and 41-44, MacFarlane teaches multiple voxels are arranged to create a three dimensional voxel array. The shape of the voxel array is cubic (col. 6, lines 7-10). The cubic voxel has equal twelve sides. This is seen to meet the claimed limitations the distance between the anode/cathode and the anode/cathode of the first RGB light emitting element and the second RGB light emitting element is twice the length of one side a pixel.

13. As to claims 19-23 and 45-48, MacFarlane teaches computer 12 operates as an interface through which information to be displayed may be input from an external source to the three dimensional monitor system (col. 6, lines 40-43).

14. As to claims 24 and 49, MacFarlane teaches a three dimensional array of optical voxels in a cubic packed configuration other voxels placement geometries may be utilized in this invention (figure 2 and 4A, col. 4, lines 64-67).

(11) Response to Argument

Response to Argument 1

Response to independent claims 2 and 26

Appellant states that "Krembs does not teach such light emitting elements having an anode, a cathode, a gas volume and a phosphorus material," at page 6. In response Examiner disagrees because Krembs expressly teaches recited in col. 2, lines 18-20, the three-dimensional gas discharge display array is formed by a plurality of parallel two-dimensional gas discharge matrices 5. The firing potential of different polarities is impressed on each of the two electrodes associated with a given intersecting point in the gas display array contained in box 7. At the point where these two electrodes intersect the applied voltages add such that the potential difference between the two electrodes is greater than the firing potential. This causes a discharge at this point (col. 2, lines 47-54) as mentioned earlier. Thus, different polarities of each the two electrodes at that point inherently perform an anode and a cathode.

Appellant states that "MacFarlane does not teach red, green, and blue light emitting elements," at page 7. In response, Examiner disagrees because MacFarlane expressly teaches a three-dimensional display device comprising a plurality of pixels each including red, green, and blue voxels (see fig. 2 and fig. 6, col. 6, lines 7-8 and col. 6, lines 23-24) as mentioned earlier. Therefore, the modified teaching of Mayer's

reference in view of the modified teaching of MacFarlane's reference provide the "substantial evidence" and established a prima facie case to meet the claimed limitations of independent claims 2 and 26.

Appellant argues that cited art fail to provide motivation/suggestion for combining reference. In response to appellant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Examiner does provide a motivation at end of each obvious statement for combining references.

In response to appellant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the appellant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this case, Appellant's arguments have been fully considered but they are not persuasive because Frembs's reference was issued since 1971, it would have been obvious to a person of ordinary skill in the art at that time of the invention was made to

utilize the three dimensional gas panel without color or red, green, and blue. MacFarlane's reference was issued since 1998, twenty-seven years difference between Frembs's reference and MacFarlane's reference, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to utilize the three dimensional gas panel with color or red, green, and blue. Thus, Krembs's reference and MacFarlane's reference are analogous arts. Therefore, Examiner provides the "substantial evidence" and established a prima facie case to counter Appellant's conclusion is based upon improper highlight reasoning.

Response to Argument 2

Response to independent claims 2 and 26

Appellant states that "Mayer does not teach a three dimensional of light emitting elements having an anode, a cathode, a gas volume and a phosphorus material," at page 13. In response, Examiner disagrees because Mayer et al expressly teaches two layers or two panels (see fig. 9) which make three-dimensional display. Aluminum wire, for example, provides a suitable conductor for this purpose which may be suitably anodized (col. 2, lines 43-46). Thus, at least two cross aluminum wires at grid 52 or grid 54 or grid 56 have an anode; therefore, if the grid is the anode, then the other grid inherently has to be a cathode. A gas volume 17, and a phosphorus material (see figure 9, column 6, lines 27-52) as mentioned earlier.

Appellant states that "there is no teaching or suggestion in MacFarlane to include a red, green, and blue voxel for each pixel of a three dimensional display of light emitting elements," at page 13. In response, Examiner disagrees because MacFarlane

expressly teaches a three-dimensional display device comprising a plurality of pixels each including red, green, and blue voxels (see fig. 2 and fig. 6, col. 6, lines 7-8 and col. 6, lines 23-24) as mentioned earlier. Therefore, the modified teaching of Mayer's reference in view of the modified teaching of MacFarlane's reference provide the "substantial evidence" and established a prima facie case to meet the claimed limitations of independent claims 2 and 26.

In response to appellant's argument that there is no suggestion to combine the references, at pages 14 and 15, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Examiner does provide a motivation at end of each obvious statement for combining references.

In response to appellant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, at page 16, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the appellant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA

1971). In this case, Appellant's arguments have been fully considered but they are not persuasive because as mentioned earlier, Mayer's reference was issued since 1974, it would have been obvious to a person of ordinary skill in the art at that time of the invention was made to utilize the three dimensional gas panel without color or red, green, and blue. MacFarlane's reference was issued since 1998, twenty-four years difference between Mayer's reference and MacFarlane's reference, it would have been obvious to a person of ordinary skill in the art at that time of the invention was made to utilize the three dimensional gas panel with color or red, green, and blue. Thus, Mayer's reference and MacFarlane's reference are analogous arts. Therefore, Examiner provides the "substantial evidence" and established a prima facie case to counter Appellant's conclusion is based upon improper highlight reasoning.

Response to dependent claims 4 and 29

Appellant states that "neither Mayer nor MacFarlance, either alone of in combination, teaches or suggests the red light emitting element, green light emitting element, and blue light emitting element each have an anode and a cathode of dependent claims 4 and 29, at pages 16 and 17. In response, Examiner disagrees because Mayer et al expressly teaches three-dimensional panel (col. 3, lines 26-27) comprising aluminum wire, for example, provides a suitable conductor for this purpose which may be suitably anodized (col. 2, lines 43-46). Thus, at least two cross aluminum wires at grid 52 or grid 54 or grid 56 have an anode and inherently have a cathode. MacFarlane expressly teaches a three-dimensional display device comprising a plurality of pixels each including red, green, and blue voxels (fig. 2 and fig. 6, col. 6, lines 7-8

and col. 6, lines 23-24) as mentioned earlier. Therefore, the modified teaching of Mayer's reference in view of the modified teaching of MacFarlane's reference provide the "substantial evidence" and established a prima facie case to meet the claimed limitations of dependent claims 4 and 29.

Response to dependent claims 5, 6, 7, 28, 30, 31 and 32

Appellant states that "neither Mayer nor MacFarlance, either alone or in combination, teaches or suggests that an anode of one of the pixels is shared by one or more other pixels (claims 5, 30), a cathode of one of pixels is shared by at least one other pixel (claim 28), face of one pixel is shared by another pixel (claims 6 and 31), a top face of a pixel is the bottom face of a neighboring pixel, and a side of the pixel is the side of another neighboring pixel (claims 7 and 32) at page 18. In response, Examiner disagrees because Mayer et al expressly teaches two layers or two panels (see fig. 9) which make three-dimensional display. The display grid cell (col. 6, line 37) makes a voxel. Three-dimensional panel (col. 3, lines 26-27) comprising aluminum wire, for example, provides a suitable conductor for this purpose which may be suitably anodized (col. 2, lines 43-46). Thus, at least two cross aluminum wires at grid 52 or grid 54 or grid 56 have an anode and inherently have a cathode. Therefore, the teaching of Mayer's reference provides the "substantial evidence" and established a prima facie case to meet the claimed limitations of dependent claims 5, 6, 7, 28, 30, 31 and 32.

Response to dependent claims 8 and 33

Appellant states "neither reference teaches or suggests that the electrical connections between the pixels, signal source and power sources are position in seams

between pixels." In response, Examiner disagrees because Mayer et al expressly teaches three-dimensional panel (col. 3, lines 26-27) comprising aluminum wire, for example, provides a suitable conductor for this purpose which may be suitably anodized (col. 2, lines 43-46). Therefore, the teaching of Mayer's reference provides the "substantial evidence" and established a prima facie case to meet the claimed limitations of dependent claims 8 and 33.

Response to dependent claims 9, 34 and 35

Appellant states "neither reference teaches or suggests and anode bus line or cathode line being positioned in a seam from an anode/cathode of one pixel to the anode/cathode of another pixel, respectively." In response, Examiner disagrees because Mayer et al expressly teaches the intersection of anodized glass wires at grids 52, 54, 56 making cubic pixels that would perform as an anode and inherently have a cathode (see col. 6, lines 1-29 and col. 7, lines 3-11). Therefore, the teaching of Mayer's reference provides the "substantial evidence" and established a prima facie case to meet the claimed limitations of dependent claims 9, 34 and 35.

Response to dependent claims 10-12 and 36-38

Appellant states "neither reference teaches or suggest the connection between two anodes of a same colored light emitting element of two pixels in the three dimensional matrix along a seam." In response, Examiner disagrees because Mayer et al expressly teaches three-dimensional matrix (col. 3, lines 26-27) comprising aluminum wire, for example, provides a suitable conductor for this purpose which may be suitably anodized (col. 2, lines 43-46). Thus, anodized aluminum wires are anode bus line. Two

layers (fig. 9, col. 6, line 27) make up the three dimensional matrix. MacFarlane expressly teaches a three-dimensional display device comprising a plurality of pixels each including red, green, and blue voxels (fig. 2 and fig. 6, col. 6, lines 7-8 and col. 6, lines 23-24) as mentioned earlier. Therefore, the modified teaching of Mayer's reference in view of the modified teaching of MacFarlane's reference provide the "substantial evidence" and established a prima facie case to meet the claimed limitations of dependent claims 10-12 and 36-38.

Response to dependent claims 15-18 and 41-44

Appellant states "MacFarlane cannot possible teach or suggest that the distance between an first anode and a second anode of a first red/green/blue light emitting element or pixel and a second red/green/blue light emitting or pixel is twice the length of one side of a pixel." In response, Examiner disagrees because Mayer et al expressly teaches the intersection of anodized glass wires at grids 52, 54, 56 making cubic pixels, and based on the **Pythagorean theorem** "the theorem that the sum of the squares of the lengths of the sides of a right triangle is equal to the square of the length of the hypotenuse". MacFarlane expressly teaches a three-dimensional display device comprising a plurality of pixels each including red, green, and blue voxels (fig. 2 and fig. 6, col. 6, lines 7-8 and col. 6, lines 23-24) as mentioned earlier. Therefore the modified teaching of Mayer's reference in view of the modified teaching of MacFarlane's reference provide the "substantial evidence" and established a prima facie case to perform equally well with the claimed limitation of dependent claims 15-18 and 41-44.

Response to dependent claims 21 and 46

Appellant states "neither reference teaches or suggests that the input image is coded in a three dimensional coordinate system." In response, Examiner disagrees because MacFarlane expressly teaches the monitor of the present invention utilizes a three-dimensional stack of voxels, a voxel array. The term voxel, or volume element, has been previously used to represent a volume of three-dimensional data stored by computer algorithms (col. 4, lines 3-7). Computer 12 operates as an interface through which information to be displayed may be input from an external source to the three dimensional monitor system (col. 6, lines 40-43) as mentioned earlier. Therefore, the teaching of MacFarlane's reference provides the "substantial evidence" and established a prima facie case to meet the claimed limitations of dependent claims 21 and 46.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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August 26, 2004

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